Another VZ200 RTTY System

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Generation of RTTY tones and BAUD rate clock can be controlled from the keyboard using a programmable interval timer. Experimental hardware and associated computer programme have been developed incorporating such a system for RTTY on the VZ200.

Armed with no previous expeience in RTTY, the writer set out to adapt a VZ200 computer for the purpose. Had the ETI-Dick Smith kit been available at the time, the project might never have been started and purchase of a kit might have been the way to go. Notwithstanding this, the project was proceeded with, to an operational state, using a number of different ideas which could well be of interest to others experimenting with the VZ200.

THE HAREWARE

The circuit of additional hardware, plugged into the VZ200 memory expansion socket, is shown in figure 1. Serial encoding and decoding of the teletype signal is carried out by a communications interface (8251 USART). The teletype programme is stored in a 2732 4 K Byte EPROM.

An important difference, to that of the ETI system, is the inclusion of an 8253 interval timer which contains three independant programmable 16 bit counters. Two of these counters are used to generate the two teletype tones divided down from the computer clock. The third counter is used to feed the USART and determine the BAUD rate. The advantage of this system is that there are no oscillators to adjust for correct frequency and tones and BAUD rate are set to an accuracy, determined by crystal control in the computer. Furthermore, the tones and the BAUD rate are under the control of software and can be changed for the computer keyboard.

The USART BAUD rate control clock is fed at sixteen times the BAUD rate. (Note: Although one times the BAUD rate can be used, errors result in decoding if the BAUD rate is not exactly synchronous to that used on the signal being received.)

Output tones are square wave and these are shaped to reduce harmonics by an RC filter network.

THE PROGRAMME

The programme developed by the writer provides selection of the following modes of operation from the keyboard —

1 ASCII or BAUDOT codes

2 BAUD rates — 45.45, 50, 56.92, 74.2, 100, 110, 150, 300, and 600 Hz.

3 Tone pairs —

Mark-Hz	SPACE-Hz
1275	1445
1275	1700
1275	2125
2125	2295
2125	2550
2125	2975

4 Two buffer stores, 1000 Bytes each.

5 Message resident in programme.

CQ de VK5BR
RYRYRY.....etc
The quick brown fox.....etc 1234567890
de VK5BR Lloyd

6 Selection of split screen or normal screen. (Split screen is used to load the buffer at the same time as receiving. Normal screen allows full use of the screen for receive only).

7 Clear screen control.

8 Reverse receive BAUDOT letters/figures. (This is useful if a letter/figure switch character is lost or one is interpreted when it shouldn't be. Sometimes a whole line can be lost when this happens unless reverse is operated).

Included in the programme is automatic insertion of carriage return and line feed at the first space after each and every 50 characters. This is a good feature to prevent printers running over the end stop and over-riding the necessity to put in CRLF when required. Sending BAUDOT, letter/figure control is also initiated on the character after each space, independant of any control put in because of a letter/figure change. This reduces the error to one word in the event of a wrong change in decoding at the receive end.

The programme resides in an EPROM at memory locations COO3H to CDOAH. RAM space utilised in 8000H to 8900H. The RTTY programme is initiated from the basic monitor with two POKE statements and an X= USR (x). Return to basic monitor can be carried out at any time with simple commands from the keyboard.

The programme is written in instructions suitable for 8080/8085 or Z80 processors, but is dedicated to the VZ200 in that it calls in the resident VZ200 keyboard, character print and beep routines.

DECODING

From the point of view of reducing component parts, a phase locked loop system (such as the XR 2211 circuit) is the simplest way to go. On the other hand, all the experts say, that in the presence of noise, better performance is achieved with a filter type system and essential for reception on the HF bands.

Many circuits have been published for both types of decoders and since the decoder design has no bearing on the computer hardware and software design, further comment will be avoided on design. At this point it must be pointed out that it would be a fairly complex decoder which could cope with all the BAUD rates and tone combinations available for transmission from this computer system. These were selected from standards recommended in Amateur Radio last year, and were all included just in case they were required. It is unlikely that other than 45 or 50 BAUDS and 2kHz tones will get used on the experimental unit assembled and at present it is being operated with a 2kHz type filter system which will accept up to 100 BAUDS.

ASSEMBLY

The VZ200 attachment was made up using a general purpose printed circuit card, suitable socket fitted and hard wired. For the present, attachment is unshielded and causes so interference to radio receivers. Fitting of a m enclosure is a job still to be tackled. What is re needed is some industrious person to layout printed circuit card and design an appropri housing.

SUMMARY

A RTTY system for the VZ200 computer been developed as an experimental exerc Transmission tones and BAUD rate clock generated from the computer clock. T programme is operational but no action has be taken to lay out an easily assembled printed circ card and shielded enclosure.

The programme has not been included as i 3338 Bytes of machine language. Those w contemplate construction many consult the wr about copying the programme.

I LIKE AMATEUR RADIO

I like amateur radio;
I really think it's fine
That I'll still be a "YL"
If I live to ninety-nine.

I like amateur radio,
And getting on the air,
Making friends around the world
And contacts everywhere.

You can talk to Lapps in Lapland,
Nepalese in Katmandu,
Malays in Kuala Lumpar,
Or Peruvians in Peru.

You can talk to dukes and dustmen,
Or communicate in Morse,
Experiment with A T V,
And RTTY of course.

Put together bits and pieces,
(Though at first the prospect balks;)
A diode here, condenser there,
And — listen to that — it talks;

Experiment with aerials,
It looks real good on paper;
But getting that lot in the air
Is quite another caper;

You can enter in a contest,
Gather points for an award,
Join a DX net, or "ragchew",
One thing's sure, you're never bored.

Yes, I like amateur radio,
And all the friendly sounds,
Removed from all the trouble and strife
With which this world abounds.

It's a satisfying hobby,
It will certainly do me;
Til they write beside my name the words
"Became a silent key." JOY COLLIS.VK2EBX

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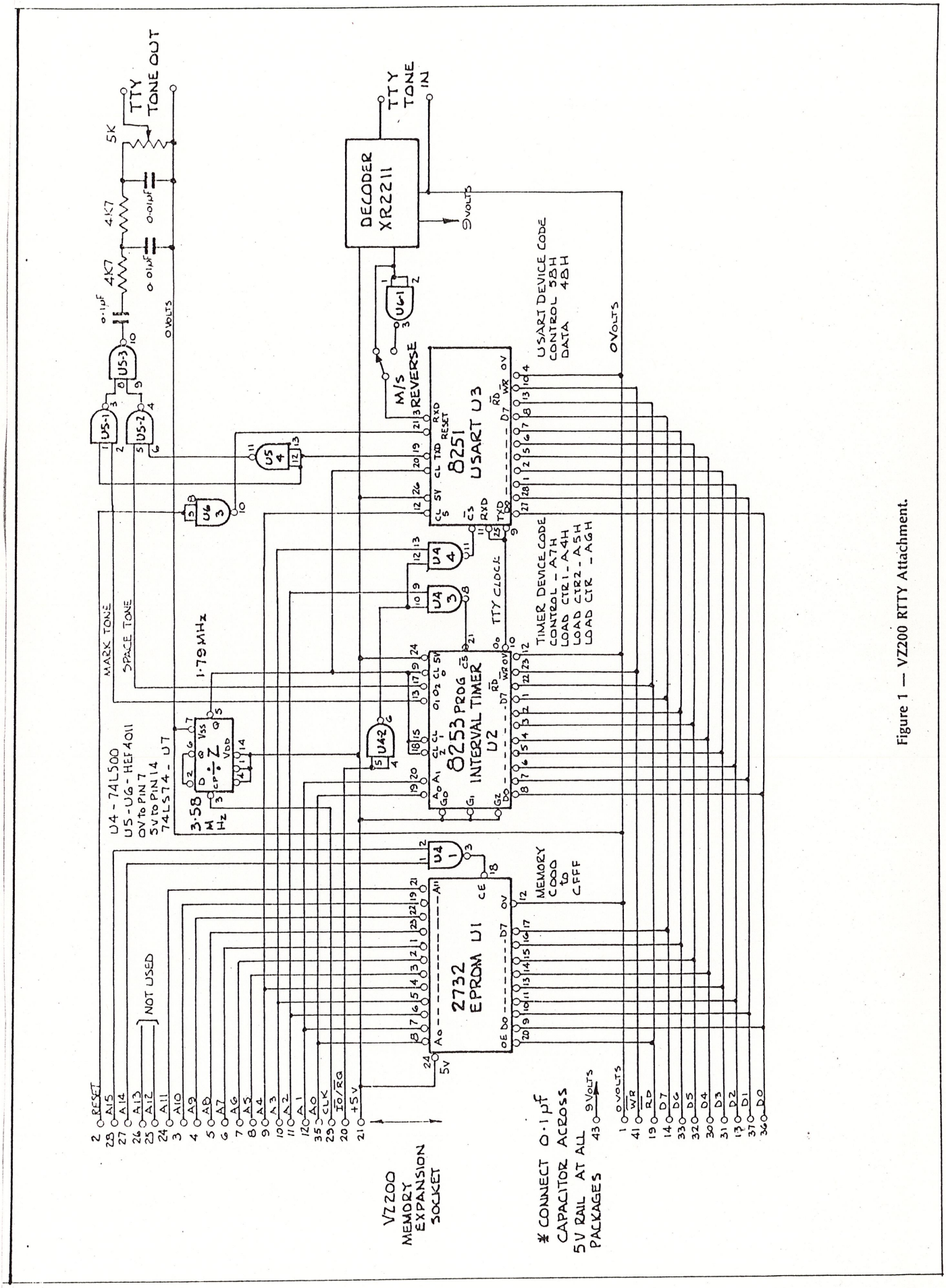

Figure 1 — VZ200 RTTY Attachment.